

APPENDIX 8.1A

Calculation of Maximum Hourly, Daily and Annual Emissions

Calculation of Maximum Hourly, Daily and Annual Emissions

Tables presented in this Appendix are as follows:

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Calculation of ammonia emissions from the gas turbines is based on the proposed ammonia slip limit of 5 ppmvd.

TABLE 8.1A-1
Ammonia Emissions

Scenario (100% Load, 59 F) GE Case 103	Emissions 1 turbine	Emissions 5 turbines
Maximum hourly (lbs)	4.91	24.55
Maximum annual (tons), based on proposed annual operating scenario	11.9	59.5
Annualized hourly emissions (lbs), at 8760 hrs/yr	2.717	13.584
Annualized Emissions, g/sec	0.343	1.713

In addition to the above tables, other miscellaneous support data for the device specific emissions calculations is also included in this Appendix.

TABLE 8.1A-2a

Detailed Calculations for Criteria Pollutant Emissions Estimates

Maximum Hourly, Daily and Annual Emissions										Base Load		Startup				Shutdown				NOx			SO2		CO			VOC			PM10			
		max. hour	hrs/day	hrs/yr	starts/day	starts/yr	stops/day	stops/yr	Base Load	lb/hr	Startup	lb/event	Shutdown	lb/event	Base Load	lb/hr	Startup	lb/event	Shutdown	lb/event	Base Load	lb/hr	Startup	lb/event	Shutdown	lb/event	Base Load	lb/hr	Startup	lb/event	Shutdown	lb/event	Base Load	lb/hr
Turbine 1 Turbine 2 Turbine 3 Turbine 4 Turbine 5	1	22	3200	2	350	2	350	2	350	8.1	7	4.3	0.62	11.9	15.40	18.2	2.36	2.10	1.60	6.0														
	1	22	3200	2	350	2	350	2	350	8.1	7	4.3	0.62	11.9	15.40	18.2	2.36	2.10	1.60	6.0														
	1	22	3200	2	350	2	350	2	350	8.1	7	4.3	0.62	11.9	15.40	18.2	2.36	2.10	1.60	6.0														
	1	22	3200	2	350	2	350	2	350	8.1	7	4.3	0.62	11.9	15.40	18.2	2.36	2.10	1.60	6.0														
	1	22	3200	2	350	2	350	2	350	8.1	7	4.3	0.62	11.9	15.40	18.2	2.36	2.10	1.60	6.0														
Fire pump engine Cooling tower	1	1	50	0	0	0	0	0	3.44	0	0	0	0.004	0.18	0	0	0	0.0	0.0	0.06														
	1	24	3200	0	350	0	350	0	0	0	0	0	0	0	0	0	0	0.0	0.0	0.444														

	Max lb/hr	NOx Max lb/day	Total tpy	Max lb/hr	SO2 Max lb/day	Total tpy	Max lb/hr	CO Max lb/day	Total tpy	Max lb/hr	VOC Max lb/day	Total tpy	Max lb/hr	PM10 Max lb/day	Total tpy	Max lb/hr	Ammonia Max lb/day	Total tpy
Turbine 1	8.1	200.8	14.9	18.2	14.6	1.1	18.2	329.0	24.9	2.36	59.3	4.4	6.0	141.2	10.4	4.91	117.8	9.6
Turbine 2	8.1	200.8	14.9	18.2	14.6	1.1	18.2	329.0	24.9	2.36	59.3	4.4	6.0	141.2	10.4	4.91	117.8	9.6
Turbine 3	8.1	200.8	14.9	18.2	14.6	1.1	18.2	329.0	24.9	2.36	59.3	4.4	6.0	141.2	10.4	4.91	117.8	9.6
Turbine 4	8.1	200.8	14.9	18.2	14.6	1.1	18.2	329.0	24.9	2.36	59.3	4.4	6.0	141.2	10.4	4.91	117.8	9.6
Turbine 5	8.1	200.8	14.9	18.2	14.6	1.1	18.2	329.0	24.9	2.36	59.3	4.4	6.0	141.2	10.4	4.91	117.8	9.6
Fire pump engine	3.4	3.4	0.09	0.2	0.0	0.0001	0.2	0.2	0.0045	0.1	0.1	0.0025	0.06	0.06	0.0015	0.0	0.0	0.0
Cooling tower	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.444	10.7	0.87	0.0	0.0	0.0
Total	43.9	1007.4	74.8	91.2	73.0	5.38	91.2	1,645.2	124.6	11.9	296.7	22.1	30.5	716.7	52.9	24.6	589.2	47.9

Assumptions:

Each turbine will startup in a 60 minute period, with all five starting up during a 1-hour time-frame.

Fire pump will not be tested more than 50 hours per year.

Turbine BACT will be:

- NOx2.5 ppm (1-hour)
- CO6.0 ppm (3-hour)
- VOC2.0 ppm

Annual Emissions are based on 3200 hours with 350 startups and 350 shutdowns for a total of 3,468 hours/yr

Startup duration = 1.2 hours per day (70 minutes) or 35 minutes per start

Shutdown duration = 0.4 hours per day (22 minutes) or 11 minutes per shutdown

TABLE 8.1A-2b

Detailed Calculations for Criteria Pollutant Air Quality Modeling Assessment

Maximum Hourly, Daily and Annual Emissions										SO2		CO		VOC		PM10	
	Base Load			Startup		Shutdown				Base Load	lb/hr	Base Load	lb/hr	Startup	lb/hr	Shutdown	lb/hr
	max. hour	hrs/day	hrs/yr	hrs/day	hrs/yr	hrs/day	hrs/yr	Base Load	lb/hr								
Turbine 1	1	20	4000	2	419	2	419	8.1	12	10.75	0.62	11.9	26.40	3.60	3.47	26.92	6.0
Turbine 2	1	20	4000	2	419	2	419	8.1	12	10.75	0.62	11.9	26.40	3.60	3.47	26.92	6.0
Turbine 3	1	20	4000	2	419	2	419	8.1	12	10.75	0.62	11.9	26.40	3.60	3.47	26.92	6.0
Turbine 4	1	20	4000	2	419	2	419	8.1	12	10.75	0.62	11.9	26.40	3.60	3.47	26.92	6.0
Turbine 5	1	20	4000	2	419	2	419	8.1	12	10.75	0.62	11.9	26.40	3.60	3.47	26.92	6.0
Emergency generator	1	1	52	0	0	0	0	32.03	0	0	0.030	4.63	0	0.0	0.0	0	0.5020
Fire pump engine	0	0	52	0	0	0	0	3.44	0	0	0.004	0.18	0	0.0	0.0	0	0.06
Cooling tower	1	20	4000	2	419	2	419	0	0	0	0	0	0	0.0	0.0	0	0.444

	NOx		SO2		CO		VOC		PM10		Ammonia	
	Max	lb/hr	Max	lb/day	Max	lb/day	Max	lb/day	Max	lb/hr	Max	lb/day
Turbine 1	12.0	207.5	14.9	0.6	26.9	344.6	3.6	61.3	6.0	144.0	4.91	117.8
Turbine 2	12.0	207.5	14.9	0.6	26.9	344.6	3.6	61.3	6.0	144.0	4.91	117.8
Turbine 3	12.0	207.5	14.9	0.6	26.9	344.6	3.6	61.3	6.0	144.0	4.91	117.8
Turbine 4	12.0	207.5	14.9	0.6	26.9	344.6	3.6	61.3	6.0	144.0	4.91	117.8
Turbine 5	12.0	207.5	14.9	0.6	26.9	344.6	3.6	61.3	6.0	144.0	4.91	117.8
Emergency generator	32.0	32.0	0.0	0.0	4.6	4.6	1.5	1.5	0.50	0.50	0.0	0.0
Fire pump engine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0.00	0.0	0.0
Cooling tower	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.444	10.7	0.0	0.0
Total	92.0	1069.5	74.4	3.1	139.2	1,727.8	19.5	308.2	30.9	731.2	24.6	589.2
	lb/hr	lb/day	lb/day	lb/hr	lb/hr	lb/day	lb/hr	lb/day	lb/hr	lb/day	lb/hr	lb/day
		tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy	tpy

Assumptions:

Each turbine will startup in a 60 minute period, with all five starting up during a 1-hour time-frame.

Emergency generator and fire pump will not both be tested on the same day.

Fire pump will not be tested more than 50 hours per year.

Emergency generator will not be tested over 50 hours per year.

Table 8.1A-3
Calculation of Noncriteria Pollutant Emissions for WCEP Turbines

Compound	Calculation of Noncriteria Pollutant Emissions from Gas Turbines (each turbine)				Emission Rates for Modeling (g/s each turbine)	
	Emission Factor, lb/MMscf (1)	Maximum Hourly Emissions, lb/hr/tur (2)	Maximum Daily Emissions, lb/day/tur	Annual Emissions, ton/yr/tur (3)	One-hour g/s/turbine	Annual g/s/turbine
Acetaldehyde	4.08E-02	3.61E-02	8.66E-01	8.71E-02	4.55E-03	2.51E-03
Acrolein	3.69E-03	3.26E-03	7.84E-02	7.88E-03	4.11E-04	2.27E-04
Ammonia	(4)	4.91E+00	2.93E+02	1.19E+01	0.619	3.42E-01
Benzene	3.33E-03	2.95E-03	7.07E-02	7.11E-03	3.71E-04	2.05E-04
1,3-Butadiene	1.27E-04	1.12E-04	2.70E-03	2.71E-04	1.42E-05	7.80E-06
Ethylbenzene	1.79E-02	1.58E-02	3.80E-01	3.82E-02	2.00E-03	1.10E-03
Formaldehyde	1.10E-01	9.73E-02	2.34E+00	2.35E-01	1.23E-02	6.76E-03
Hexane	2.59E-01	2.29E-01	5.50E+00	5.53E-01	2.89E-02	1.59E-02
Naphthalene	1.33E-03	1.18E-03	2.82E-02	2.84E-03	1.48E-04	8.17E-05
PAHs (total)	1.65E-04	1.46E-04	3.50E-03	3.52E-04	1.84E-05	1.01E-05
Propylene	7.70E-01	6.81E-01	1.63E+01	1.64E+00	8.58E-02	4.73E-02
Propylene oxide	2.96E-02	2.62E-02	6.29E-01	6.32E-02	3.30E-03	1.82E-03
Toluene	7.10E-02	6.28E-02	1.51E+00	1.52E-01	7.91E-03	4.36E-03
Xylene	2.61E-02	2.31E-02	5.54E-01	5.57E-02	2.91E-03	1.60E-03

Notes:

- (1) Provided by CARB CATEF database and other AFC values for similar sized turbines.
- (2) Based on maximum hourly turbine fuel use of 1000 Btu/scf gives 884.73 MMBtu/hr/turbine (w/o duct burner) and fuel HHV of 1000 Btu/scf gives 0.8847 MMscf/hr/turbine.
- (3) Based on maximum annual turbine fuel use of 1000 Btu/scf gives 4,270,000 MMBtu/yr/turbine (w/o duct burner) and fuel HHV of 1000 Btu/scf gives 4270.0000 MMscf/yr/turbine.
- (4) Based on 5 ppm ammonia slip from SCR system.
- (5) Polycyclic aromatic hydrocarbons, excluding naphthalene (treated separately).

Table 8.1A-4

Expected Cooling Tower PM10 Emissions

Project:	EME-Walnut Creek EP	Tower Dimensions	
Mfg:	Marley	Deck Height:	27.09 Ft. AGL
# Cells:	5	Deck Length:	210.7 Ft.
acfm/Cell:	883000	Deck Width:	36.67 Ft.
Drift Loss	0.0005 %	Fan Exit Height:	39.09 Ft. AGL
Drift Frac:	0.000005	Exhaust Fan Diam:	22 Ft.
Water Source:	Reclaim/Recycled Water	Operational Data:	
TDS (mg/l) * :	5000	Hrs/Day:	24
Cycles of Concentration:	8.1	Hrs/Yr:	4838
Circulating Water Rate (gpm):	35500		
Circulating Water Rate (MMlbs/hr):	17.74		
Total PM10 Emissions:	lbs/hr:	0.444	
	lbs/day:	10.65	
	tons/yr:	1.07	
	Hourly g/sec/cell:	0.0112	
	Annual g/sec/cell:	0.0062	(annualized for 8760 hours/yr)

* Total Maximum TDS expected in circulating water.

Table 8.1A-5

Calculation of Noncriteria Pollutant Emissions from WCEP Cooling Tower

Constituent	Calculation of Noncriteria Pollutant Emissions from Cooling Tower (all cells)				Emission Rates for Modeling (g/s each cell)		
	Concentration in Cooling Tower Water *	Maximum		Annual Emissions, ton/yr	One-hour g/s/cell	Annual g/s/cell	
		Hourly Emissions, lb/hr	Daily Emissions, lb/day				
Ammonia	0	ppmw	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
Arsenic	0.00727	ppmw	7.75E-08	7.81E-09	8.13E-11	4.49E-11	
Cadmium	0.00242	ppmw	2.58E-08	2.60E-09	2.71E-11	1.50E-11	
Chromium	0.081	ppmw	8.63E-07	8.70E-08	9.06E-10	5.01E-10	
Copper	0.0485	ppmw	5.17E-07	5.21E-08	5.43E-10	3.00E-10	
Lead	0.0081	ppmw	8.63E-08	8.70E-09	9.06E-11	5.01E-11	
Mercury	0.00024	ppmw	2.56E-09	2.58E-10	2.69E-12	1.48E-12	
Nickel	0.145	ppmw	1.55E-06	1.56E-07	1.62E-09	8.96E-10	
Silver	0.0016	ppmw	1.70E-08	1.72E-09	1.79E-11	9.89E-12	
Zinc	0.6462	ppmw	6.89E-06	6.94E-07	7.23E-09	3.99E-09	
Notes:	(1) Emissions calculated from max total drift rate of				0.444	lb/hr for	5 cells
	(2) Daily emissions assumes:						
	(3) Annual emissions assumes:						

(1) Emissions calculated from max total drift rate of 24.0 hrs/day operation.

(2) Daily emissions assumes: 4838.0 hrs/yr operation.

(3) Annual emissions assumes: 4838.0 hrs/yr operation.

ppmw = mg/l

* Based on 8.1 cycles of concentration and avg constituents per water analysis data.

Table 8.1A-6 EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel

Engine ID: Fire Pump

Mfg:	Clarke	Stack Data (per stack)		
Model:	JW6H-UF40	Height:	48.3 Ft.	
Capacity:	0 Kw	Diameter:	5 inches	
BHP:	300	Temp:	738 deg F	
RPM:	2350	ACFM:	2058 at stack temp	
Fuel:	#2 Diesel	O2:	%	
Fuel Use:	14.5 Gph	H2O:	%	
FuelHHV:	137000 Btu/gal	DSCFM:	at STP	
mmbtu/hr:	1.99 HHV	Area:	0.137 Sq.Ft.	
# of Cyl:	6	Velocity:	15029 Ft/Min	
Engine Design:	Lean-Burn	Max Daily Op Hrs:	1	
# of Exhaust Stacks:	1	Max Annual Op Hrs:	52	
Fuel Wt:	6.87 Lbs/gal			
Fuel S:	0.05 % wt.			
Fuel S:	3.435 Lbs/1000 gal			
SO2:	6.87 Lbs/1000 gal			
Efs (g/bhp/hr)		Lb/Hr	Lb/Day	Tons/Yr
NOx	5.2	3.44	3.44	0.0893
CO	0.27	0.18	0.18	0.0046
VOC	0.15	0.10	0.10	0.0026
PM10	0.09	0.06	0.06	0.0015
SOx	0.0055	0.0036	0.0036	0.0001
SOx(fuel)	NA	0.10	0.10	0.0026
Efs(lb/mmbtu)		Lb/Hr	Lb/Day	Tons/Yr
NOx	0	0	0	0
CO	0	0	0	0
VOC	0	0	0	0
PM10	0	0	0	0

Table 8.1A-7

Liquid Fuel IC Engine Air Toxics Emissions Calculations

Engine ID:	Fire Pump		
Fuel Type:	Diesel	Max Hrs/Day:	1
Gal/Hr:	14.5	Max Hrs/Yr:	52
Mgal/Hr:	0.0145		
Mgal/Yr:	0.754		

Substance	EF				Max Hr.	Annual
	lbs/Mgal	lbs/hr	lbs/yr	tons/yr		
Acenaphtene	6.71E-04	9.73E-06	5.06E-04	2.53E-07	1.23E-06	7.28E-09
Acenaphthylene	1.02E-03	1.48E-05	7.69E-04	3.85E-07	1.87E-06	1.11E-08
Anthracene	2.23E-04	3.23E-06	1.68E-04	8.41E-08	4.08E-07	2.42E-09
Benzo-a-anthracene	9.60E-05	1.39E-06	7.24E-05	3.62E-08	1.76E-07	1.04E-09
BaP	7.90E-05	1.15E-06	5.96E-05	2.98E-08	1.44E-07	8.58E-10
Benzo-a-fluoranthene	1.12E-04	1.62E-06	8.44E-05	4.22E-08	2.05E-07	1.22E-09
Benzo-ghi-perylene	9.00E-05	1.31E-06	6.79E-05	3.39E-08	1.65E-07	9.77E-10
Benzo-k-fluoranthene	7.83E-05	1.14E-06	5.90E-05	2.95E-08	1.43E-07	8.50E-10
Chrysene	1.30E-04	1.89E-06	9.80E-05	4.90E-08	2.38E-07	1.41E-09
Dibenz-ah-anthracene	8.20E-05	1.19E-06	6.18E-05	3.09E-08	1.50E-07	8.90E-10
Fluoranthene	3.30E-04	4.79E-06	2.49E-04	1.24E-07	6.03E-07	3.58E-09
Fluorene	9.65E-04	1.40E-05	7.28E-04	3.64E-07	1.76E-06	1.05E-08
Indeno-123cd-pyrene	8.45E-05	1.23E-06	6.37E-05	3.19E-08	1.55E-07	9.17E-10
Naphthalene	1.60E-02	2.32E-04	1.21E-02	6.03E-06	2.93E-05	1.74E-07
Phenanthrene	3.54E-03	5.13E-05	2.67E-03	1.33E-06	6.47E-06	3.84E-08
Pyrene	2.64E-04	3.83E-06	1.99E-04	9.95E-08	4.83E-07	2.87E-09
Ethylbenzene	6.76E-03	9.80E-05	5.10E-03	2.55E-06	1.24E-05	7.34E-08
13 Butadiene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acetaldehyde	3.47E-03	5.03E-05	2.62E-03	1.31E-06	6.35E-06	3.77E-08
Acrolein	1.07E-03	1.55E-05	8.07E-04	4.03E-07	1.96E-06	1.16E-08
Benzene	1.81E-01	2.62E-03	1.36E-01	6.82E-05	3.31E-04	1.96E-06
Formaldehyde	5.10E-02	7.40E-04	3.85E-02	1.92E-05	9.33E-05	5.54E-07
Propylene	3.41E-01	4.94E-03	2.57E-01	1.29E-04	6.24E-04	3.70E-06
Toluene	6.10E-02	8.85E-04	4.60E-02	2.30E-05	1.12E-04	6.62E-07
Xylenes	2.10E-02	3.05E-04	1.58E-02	7.92E-06	3.84E-05	2.28E-07
Hexane	1.39E-03	2.02E-05	1.05E-03	5.24E-07	2.54E-06	1.51E-08
Arsenic	1.60E-03	2.32E-05	1.21E-03	6.03E-07	2.93E-06	1.74E-08
Beryllium	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cadmium	1.50E-03	2.18E-05	1.13E-03	5.66E-07	2.74E-06	1.63E-08
Hex Chromium	1.00E-04	1.45E-06	7.54E-05	3.77E-08	1.83E-07	1.09E-09
Copper	4.10E-03	5.95E-05	3.09E-03	1.55E-06	7.50E-06	4.45E-08
Lead	8.30E-03	1.20E-04	6.26E-03	3.13E-06	1.52E-05	9.01E-08
Manganese	3.10E-03	4.50E-05	2.34E-03	1.17E-06	5.67E-06	3.36E-08
Mercury	2.00E-03	2.90E-05	1.51E-03	7.54E-07	3.66E-06	2.17E-08
Nickel	3.90E-03	5.66E-05	2.94E-03	1.47E-06	7.13E-06	4.23E-08
Selenium	2.20E-03	3.19E-05	1.66E-03	8.29E-07	4.02E-06	2.39E-08
Zinc	2.24E-02	3.25E-04	1.69E-02	8.44E-06	4.10E-05	2.43E-07
Diesel PM	8.3E+00	1.20E-01	6.2E+00	3.12E-03	1.51E-02	8.99E-05

EFs: CARB-CATEF Database (mean values for source type and category)

Metals EFs from VCAPCD, 1/8/96

Table 8.1A-8 EXPECTED INTERNAL COMBUSTION ENGINE EMISSIONS

Liquid Fuel

Engine ID:

Gen Set

Mfg: Caterpillar

Model: 3516B TA

Capacity: 1750 Kw

BHP: 2347

RPM: 2350

Fuel: #2 Diesel

Fuel Use: 119.3 Gph

FuelHHV: 137000 Btu/gal

mmbtu/hr: 16.34 HHV

of Cyl: 12

Engine Design: Lean-Burn

of Exhaust Stacks: 1

Fuel Wt: 6.87 Lbs/gal

Fuel S: 0.05 % wt.

Fuel S: 3.435 Lbs/1000 gal

SO₂: 6.87 Lbs/1000 gal

Efs (g/bhp/hr)

NO_x 6.19

CO 0.89

VOC 0.3

PM₁₀ 0.1SO_x 0.0055SO_x(fuel) NA

Lb/Hr

32.00

4.60

1.55

0.52

0.0284

0.82

Stack Data (per stack)

Height: 53.3 Ft.

Diameter: 8 inches

Temp: 797 deg F

ACFM: 13843 at stack temp

O₂: %H₂O: %

DSCFM: at STP

Area: 0.351 Sq.Ft.

Velocity: 39490 Ft/Min

Max Daily Op Hrs: 1

Max Annual Op Hrs: 52

Lb/Day

32.00

4.60

1.55

0.52

0.0284

0.82

Tons/Yr

0.8320

0.1196

0.0403

0.0134

0.0007

0.0213

Efs(lb/mmbtu)

NO_x 0

CO 0

VOC 0

PM₁₀ 0

Lb/Hr

0

0

0

0

Lb/Day

0

0

0

0

Tons/Yr

0

0

0

0

Table 8.1A-9

Liquid Fuel IC Engine Air Toxics Emissions Calculations

Engine ID: Emer Gen Set

Fuel Type: Diesel

Max Hrs/Day:

1

Gal/Hr: 119.3

Max Hrs/Yr:

52

Mgal/Hr: 0.1193

Mgal/Yr: 6.2036

Substance	EF				Max Hr.	Annual
	lbs/Mgal	lbs/hr	lbs/yr	tons/yr		
Acenaphtene	6.71E-04	8.01E-05	4.16E-03	2.08E-06	1.01E-05	5.99E-08
Acenaphthylene	1.02E-03	1.22E-04	6.33E-03	3.16E-06	1.53E-05	9.11E-08
Anthracene	2.23E-04	2.66E-05	1.38E-03	6.92E-07	3.36E-06	1.99E-08
Benzo-a-anthracene	9.60E-05	1.15E-05	5.96E-04	2.98E-07	1.44E-06	8.57E-09
BaP	7.90E-05	9.42E-06	4.90E-04	2.45E-07	1.19E-06	7.06E-09
Benzo-a-fluoranthene	1.12E-04	1.34E-05	6.95E-04	3.47E-07	1.69E-06	1.00E-08
Benzo-ghi-perylene	9.00E-05	1.07E-05	5.58E-04	2.79E-07	1.35E-06	8.04E-09
Benzo-k-fluoranthene	7.83E-05	9.34E-06	4.86E-04	2.43E-07	1.18E-06	6.99E-09
Chrysene	1.30E-04	1.55E-05	8.06E-04	4.03E-07	1.96E-06	1.16E-08
Dibenz-ah-anthracene	8.20E-05	9.78E-06	5.09E-04	2.54E-07	1.23E-06	7.32E-09
Fluoranthene	3.30E-04	3.94E-05	2.05E-03	1.02E-06	4.96E-06	2.95E-08
Fluorene	9.65E-04	1.15E-04	5.99E-03	2.99E-06	1.45E-05	8.62E-08
Indeno-123cd-pyrene	8.45E-05	1.01E-05	5.24E-04	2.62E-07	1.27E-06	7.55E-09
Naphthalene	1.60E-02	1.91E-03	9.93E-02	4.96E-05	2.41E-04	1.43E-06
Phenanthrene	3.54E-03	4.22E-04	2.20E-02	1.10E-05	5.33E-05	3.16E-07
Pyrene	2.64E-04	3.15E-05	1.64E-03	8.19E-07	3.97E-06	2.36E-08
Ethylbenzene	6.76E-03	8.06E-04	4.19E-02	2.10E-05	1.02E-04	6.04E-07
13 Butadiene	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Acetaldehyde	3.47E-03	4.14E-04	2.15E-02	1.08E-05	5.22E-05	3.10E-07
Acrolein	1.07E-03	1.28E-04	6.64E-03	3.32E-06	1.61E-05	9.56E-08
Benzene	1.81E-01	2.16E-02	1.1E+00	5.61E-04	2.72E-03	1.62E-05
Formaldehyde	5.10E-02	6.08E-03	3.16E-01	1.58E-04	7.67E-04	4.55E-06
Propylene	3.41E-01	4.07E-02	2.1E+00	1.06E-03	5.13E-03	3.05E-05
Toluene	6.10E-02	7.28E-03	3.78E-01	1.89E-04	9.18E-04	5.45E-06
Xylenes	2.10E-02	2.51E-03	1.30E-01	6.51E-05	3.16E-04	1.88E-06
Hexane	1.39E-03	1.66E-04	8.62E-03	4.31E-06	2.09E-05	1.24E-07
Arsenic	1.60E-03	1.91E-04	9.93E-03	4.96E-06	2.41E-05	1.43E-07
Beryllium	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cadmium	1.50E-03	1.79E-04	9.31E-03	4.65E-06	2.26E-05	1.34E-07
Hex Chromium	1.00E-04	1.19E-05	6.20E-04	3.10E-07	1.50E-06	8.93E-09
Copper	4.10E-03	4.89E-04	2.54E-02	1.27E-05	6.17E-05	3.66E-07
Lead	8.30E-03	9.90E-04	5.15E-02	2.57E-05	1.25E-04	7.41E-07
Manganese	3.10E-03	3.70E-04	1.92E-02	9.62E-06	4.66E-05	2.77E-07
Mercury	2.00E-03	2.39E-04	1.24E-02	6.20E-06	3.01E-05	1.79E-07
Nickel	3.90E-03	4.65E-04	2.42E-02	1.21E-05	5.87E-05	3.48E-07
Selenium	2.20E-03	2.62E-04	1.36E-02	6.82E-06	3.31E-05	1.96E-07
Zinc	2.24E-02	2.67E-03	1.39E-01	6.95E-05	3.37E-04	2.00E-06
Diesel PM	8.3E+00	9.88E-01	5.1E+01	2.57E-02	1.25E-01	7.39E-04

EFs: CARB-CATEF Database (mean values for source type and category)

Metals EFs from VCAPCD, 1/8/96

TABLE 8.1A-10
Commissioning Emissions

Commissioning Phase	1	2	3	4	5	6	Total
Water Injection	No	No	50%	Yes	Yes	Yes	
SCR Installed	No	No	No	No	50%	Yes	
CO Catalyst Installed	No	No	No	No	Yes	Yes	
Hours per Unit	20	14	24	12	24	40	134
# Units Operating Simultaneously *	4	3	1	5	5	5	
Avg Load %	0	5	50	100	75	100	
NOx lb/hr	91	99	175	81	35	8.1	
CO lb/hr	55	60	168	255	9	12	
VOC lb/hr	2	2	3	5	4	2	
MMBtu/hr - HHV	150	180	500	900.5	700	900.5	
NOx lb/mmcf	641	581	370	95	53	9	
CO lb/mmcf	387	352	355	299	14	14	
VOC lb/mmcf	14	12	6	6	6	2	
Total NOx lbs (5 units)	9,100	6,930	21,000	4,860	4,200	1,620	47,710
Total CO lbs (5 units)	5,500	4,200	20,160	15,300	1,080	2,400	48,640
Total VOC lbs	200	140	360	300	480	400	1,880

* Assume this number of units operate simultaneously at condition stated with the remaining units operating at fully commissioned full output conditions.

Nat. Gas MMBtu/mmcf 1056
Number of GT Units 5

Phase	Description
1	Pre- break in checkout
2	Controlled break-in run
3	Water injection commissioning
4	Complete AVR commissioning
5	SCR commissioning
6	Full load testing & checkout

Assume that water injection is 50% effective

Assume that NOx SCR is 50% effective and CO catalyst is 100% effective

TABLE 8.1A-11

Fuel Use Calculations

Assumptions

1	Operational scenario (see Table 8.1A-2A)	
2	GE run case 103a @ 811.3 mmbtu/hr LHV	811.3
3	LHV x 1.11 = HHV = 900.54 mmbtu/hr HHV	900.54
4	Total run hours = 3468 (normal ops plus startups and shutdowns)	3468
5	Startup and shutdown hours assumed full hour fuel use	
6	Gas heat content = 1000 btu/scf per CEC definitions	1000
	(vs. 1056 btu/scf stated in AFC)	
7	Max daily hours = 24 (22+1.5+.5)	1056 0.9470
8	5 turbines total	24 5

	1 Turbine			5 Turbines		
	mmbtu	scf(1)	scf(2)	mmbtu	scf(1)	scf(2)
Max Hour	9.01E+02	9.01E+05	8.53E+05	4.50E+03	4.50E+06	4.26E+06
Max Daily	2.16E+04	2.16E+07	2.05E+07	1.08E+05	1.08E+08	1.02E+08
Max Annual	3.12E+06	3.12E+09	2.96E+09	1.56E+07	1.56E+10	1.48E+10

scf(1) = 1000 btu/scf *

scf(2) = 1056 btu/scf

CEC definition: 1 Mcf = 1000 scf = 10⁶ btu therefore 1000 btu/scf

* Due to the inherent fluctuations in gas btu content, this value should be used for purposes of computing toxics emissions, and for potential setting of gas use limitations on the air permit.

TABLE 8.1A-12

South Coast AQMD Monthly Emissions Calculations (lbs)

		lbs/hr	lbs/day	31 day lbs/month	30 day avg lbs/month	Offsets Req'd		Annual TPY
						lbs/month	lb-day	
Cooling Tower	PM10	0.444	10.7	330.3	319.7	383.6	13	0.8
Fire Pump	NOx	3.44	3.44	17.2	16.6			0.086
	CO	0.2	0.2	1.0	1.0	1.2	0	0.005
	VOC	0.1	0.1	0.5	0.5	0.6	0	0.003
	PM10	0.06	0.06	0.3	0.3	0.3	0	0.002
	SOx	0.004	0.004	0.0	0.0			0.0001
Turbine 1	NOx	8.1	200.8	3951.2	3823.7			14.9
	CO	11.9	329.0	6484.8	6275.6	7530.7	251	24.9
	VOC	2.36	59.3	1167.52	1129.9	1355.8	45	4.4
	PM10	6	141.2	2776	2686.5	3223.7	107	10.4
	SOx	0.62	14.6	286.85	277.6			1.1
	NH3	4.91	115.5	2271.69	2198.4			8.5
Turbine 2	NOx	8.1	200.8	3951.2	3823.7			14.9
	CO	11.9	329.0	6484.8	6275.6	7530.7	251	24.9
	VOC	2.36	59.3	1167.52	1129.9	1355.8	45	4.4
	PM10	6	141.2	2776	2686.5	3223.7	107	10.4
	SOx	0.62	14.6	286.85	277.6			1.1
	NH3	4.91	115.5	2271.69	2198.4			8.5
Turbine 3	NOx	8.1	200.8	3951.2	3823.7			14.9
	CO	11.9	329.0	6484.8	6275.6	7530.7	251	24.9
	VOC	2.36	59.3	1167.52	1129.9	1355.8	45	4.4
	PM10	6	141.2	2776	2686.5	3223.7	107	10.4
	SOx	0.62	14.6	286.85	277.6			1.1
	NH3	4.91	115.5	2271.69	2198.4			8.5
Turbine 4	NOx	8.1	200.8	3951.2	3823.7			14.9
	CO	11.9	329.0	6484.8	6275.6	7530.7	251	24.9
	VOC	2.36	59.3	1167.52	1129.9	1355.8	45	4.4
	PM10	6	141.2	2776	2686.5	3223.7	107	10.4
	SOx	0.62	14.6	286.85	277.6			1.1
	NH3	4.91	115.5	2271.69	2198.4			8.5
Turbine 5	NOx	8.1	200.8	3951.2	3823.7			14.9
	CO	11.9	329.0	6484.8	6275.6	7530.7	251	24.9
	VOC	2.36	59.3	1167.52	1129.9	1355.8	45	4.4
	PM10	6	141.2	2776	2686.5	3223.7	107	10.4
	SOx	0.62	14.6	286.85	277.6			1.1
	NH3	4.91	115.5	2271.69	2198.4			8.5
Max Month Avg Daily Emissions (lb-day)				NOx	CO	VOC	PM10	SOx
(adjusted for the ERC ratio)				N/A	1255.2	226.0	550.1	N/A
Total Annual Emissions (tons):				NOx	CO	VOC	PM10	SOx
				74.77	124.61	22.12	52.80	5.38
				RTCs				RTCs
Monthly Operations Data				Max Month = 31 days		Normal	Startup	Shutdown
						lbs/hr	lb/event	lb/event
Base	Annual	Max Month		NOx		8.1	7	4.3
	Hours	3200	432	CO		11.9	15.4	18.2
	Startups	350	40	VOC		2.36	2.1	1.6
	Shutdowns	350	40	PM10		6	3.5	1.1
	Total	3468	463	SOx		0.62	0.36	0.11
RTCs for NOx and SOx based on a 1:1 ratio.				NH3		4.91	2.86	0.90
ERC ratio for PM10, VOC, and CO is 1.2:1								

GE Energy

Engine: LMS100 PA
Deck Info: G0179C - 87α.scp
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

[illegible][illegible]

Pressure Losses											
Inlet Loss, inH ₂ O	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH ₂ O	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	100	75	50	100	75	50	100	75	50	100	75
kW, Gen Terms	103803	77872	51932	101304	75998	50683	94235	47151	94420	70837	47243
Est. Btu/kW-hr, LHV	7739	8087	8899	7814	8148	8981	7942	8307	7937	8302	9172
Guar. Btu/kW-hr, LHV	8051	8424	9270	8140	8488	9355	8272	8653	9560	8268	8648

Fuel Flow	803.3	629.7	462.1	791.6	619.3	455.2	748.4	587.3	432.8	749.5	588.1	433.3	749.6	588.2	433.7
MMBtu/hr, LHV															
lb/hr	38941	30527	22402	38373	30019	22065	36277	28468	20978	36330	28507	21006	36337	28513	21025

[illegible][illegible][illegible]

IC Heat Extraction, btu/s	22335	16763	10577	24475	19046	12361	26950	21072	13424	26649	20807	13219	26042	20285	13357
KOD Water Extraction, lb/s	0.0	0.0	0.0	0.0	0.0	0.0	1.7	1.1	0.2	1.4	0.8	0.0	0.7	0.2	0.0
Control Parameters															
HP Speed, RPM	9304	9121	8945	9350	9144	8969	9357	9150	8979	9357	9150	8979	9357	9150	8975
LP Speed, RPM	5246	4802	4578	5332	4889	4695	5272	4942	4719	5273	4942	4719	5274	4945	4723
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600	3600
P53 - CDP, psia	567.0	470.6	364.1	553.9	461.2	357.2	525.0	438.2	340.2	525.7	438.8	340.6	525.8	438.9	340.8
T23 - Inlet Inlet Temp, °F	304.8	279.6	242.7	329.7	307.5	269.4	345.8	325.6	288.2	346.2	326.0	288.6	348.5	328.3	290.7
P23 - Inlet Inlet Pressure, psia	55.8	50.4	42.5	54.0	49.3	41.6	51.4	47.1	39.9	51.4	47.1	39.9	51.4	47.2	40.0
W23 - Inlet Inlet Flow, lb/s	451.1	393.2	343.8	438.2	377.8	331.2	417.4	360.2	316.0	417.7	360.3	316.2	417.0	359.8	315.8
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	723	690	661	725	688	660	721	685	657	721	685	657	721	685	657
T48IN, °R	2013	1934	1868	2031	1942	1877	2031	1943	1879	2031	1943	1879	2031	1943	1878
T48IN, °F	1553	1475	1408	1571	1482	1417	1572	1483	1419	1572	1483	1419	1572	1483	1419
Exhaust Parameters															
Temperature, °F	761.6	747.9	765.2	781.6	760.1	777.7	796.6	775.7	793.5	796.2	775.4	793.2	796.1	775.3	792.6
lb/sec	469.3	399.6	316.2	455.5	390.2	309.0	431.3	370.2	293.8	432.0	370.7	294.2	432.0	370.8	294.5
lb/hr	1689503	1438390	1138229	1639789	1404741	1112333	1552794	1332730	1057689	1555029	1334518	1058981	1555360	1334755	1060148
Energy, Btu/s - ref 0 °R	147763	123572	98734	146566	122430	97924	140846	118056	94776	141000	118177	94866	141020	118194	94820
Cp, Btu/lb-R	0.2742	0.2718	0.2707	0.2763	0.2733	0.2723	0.2774	0.2747	0.2741	0.2774	0.2747	0.2741	0.2773	0.2747	0.2738
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)															
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	81	63	46	80	62	46	75	59	43	75	59	44	75	59	44
CO ppmvd Ref 15% O2	144	149	132	129	126	108	115	107	80	115	107	80	115	107	85
CO, lb/hr	282.76	229.64	148.93	243.82	191.71	119.89	211.11	153.49	84.89	211.64	153.91	85.32	211.82	154.04	90.65
CO2, lb/hr	104573.10	82019.13	60263.20	103080.40	80704.15	59395.87	97493.02	76580.73	56515.52	97634.09	76686.30	56591.03	97651.41	76701.73	56634.83
HC ppmvd Ref 15% O2	7	7	6	6	6	4	5	4	2	5	4	2	5	4	2
HC, lb/hr	7.72	6.39	3.85	6.37	4.82	2.64	4.95	3.36	1.26	4.96	3.37	1.28	4.97	3.38	1.51
SOx as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Maximim Emissions - Turbine															
NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
CO ppmvd Ref 15% O2	168	168	168	148	148	148	139	139	139	139	139	139	138	138	138
VOC ppmvd Ref 15% O2	4.2	4.2	3.6	3.6	3.6	2.4	3.0	2.4	1.2	3.0	2.4	1.2	3.0	2.4	1.2
PM10 lbs/hr	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Predicted (P) / Guaranteed Emissions - Stack															
NOx ppmvd Ref 15% O2	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5
NOx as NO2, lb/hr	8.1	6.3	4.6	8.0	6.2	4.6	7.5	5.9	4.3	7.5	5.9	4.4	7.5	5.9	4.4
NH3 Slip ppmvd Ref 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO ppmvd Ref 15% O2	6.3 (P)	6.3 (P)	6.3 (P)	5.6 / 6.0	5.6 / 6.0	5.6 / 6.0	5.3 / 6.0	5.3 / 6.0	5.3 / 6.0	5.3 / 6.0	5.3 / 6.0	5.3 / 6.0	5.2 / 6.0	5.2 / 6.0	5.2 / 6.0
CO, lb/hr	12.4	9.7	7.1	10.9 / 11.6	8.5 / 9.2	6.2 / 6.7	9.7 / 11.0	7.6 / 8.6	5.6 / 6.4	9.8 / 11.1	7.6 / 8.7	5.7 / 6.4	9.6 / 11.1	7.5 / 8.7	5.6 / 6.4
VOC ppmvd Ref 15% O2	2.8 (P)	2.8 (P)	2.4 (P)	2.3 (P)	2.4 (P)	1.8 (P)	1.9 (P)	1.6 (P)	0.8 (P)	1.9 (P)	1.6 (P)	0.8 (P)	1.9 (P)	1.6 (P)	0.8 (P)
VOC, lb/hr	3.1	2.6	1.6	2.5	1.9	1.1	1.9	1.4	0.5	1.9	1.4	0.5	1.9	1.4	0.5

Based on the stated level of SOx (i.e. 0), there should be no particulate contribution from the catalysts.

Carbon Dioxide	1.2430	3.2480	1.2430	3.2480	1.2430	3.2480	1.2430	3.2480	1.2430	3.2480
	0.4030	0.6703	0.4030	0.6703	0.4030	0.6703	0.4030	0.6703	0.4030	0.6703
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Nitrogen	20629		20629		20629		20629		20629	
	918		918		918		918		918	
	1018		1018		1018		1018		1018	
	22871		22871		22871		22871		22871	
	77.0		77.0		77.0		77.0		77.0	
	0.983		0.983		0.983		0.983		0.983	
	0.58		0.58		0.58		0.58		0.58	
Butylb, LHV	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Exhaust MW	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Exhaust Flow, ACFM	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Exhaust Flow, SCFM	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Exhaust Flow, Btu/lb	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Exhaust Flow, Calories/s	28.1	28.2	28.3	28.0	28.1	28.1	28.0	28.1	28.0	28.1
	913696	766517	613290	903968	758083	729849	867542	868512	868637	730721
	364419	309169	243886	354723	302731	287761	336362	336845	336913	288194
	315	309	312	322	314	319	327	326	326	319
	37241198	31140240	24881057	36934636	30852332	29750051	35493302	23906328	35537016	29784977
Inlet Flow Wet, pps	451.4	393.4	344.0	438.5	378.0	360.3	417.6	360.5	417.2	360.0
	450.4	392.6	343.3	434.9	374.9	354.4	410.7	354.8	411.3	354.9
Inlet Flow Dry, pps	141384	106387	71439	138009	103861	96716	128463	96903	128749	96929
Shaft HP	141384	106387	71439	138009	103861	96716	128463	96903	128749	96929
Generator Information	122564	122564	122564	130500	130500	126633	126633	122927	122927	103096
	0.985	0.982	0.975	0.984	0.981	0.980	0.984	0.980	0.984	0.980
	Efficiency									
	Inlet Temp, °F	30.0	30.0	59.0	59.0	84.0	84.0	90.0	90.0	110.0
	Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
8th Stage Bleed	Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	Temperature, °R	0	0	0	0	0	0	0	0	0
CDP Bleed	Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
CardPack	87o	87o	87o	87o	87o	87o	87o	87o	87o	87o
	87m	87m	87m	87m	87m	87m	87m	87m	87m	87m
Intercooler Cardpack	332	0	0	334	0	0	334	0	334	0
	NSI									
	NSI	0	0	0	0	0	0	0	0	0
	NSI	0	0	0	0	0	0	0	0	0

Estimated Average Engine Performance NOT FOR GUARANTEE



GE Energy

Performance By: Johnny Metcalf
Project Info:

Engine: LMS100 PA
Deck Info: G0179C - 87o.scp
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

Date: 08/09/2005
Time: 2:44:28 PM
Version: 3.3.6

Case #	100	101	102	103	104	105	106	107	108
Ambient Conditions									
Dry Bulb, °F	84.0	84.0	84.0	90.0	90.0	90.0	110.0	110.0	110.0
Wet Bulb, °F	70.7	70.7	70.7	69.7	69.7	69.7	67.9	67.9	67.9
RH, %	53.0	53.0	53.0	37.0	37.0	37.0	10.0	10.0	10.0
Altitude, ft	1460.0	1460.0	1460.0	1640.0	1640.0	1640.0	1460.0	1460.0	1460.0
Ambient Pressure, psia	13.937	13.937	13.937	13.846	13.846	13.846	13.937	13.937	13.937
Engine Inlet									
Comp Inlet Temp, °F	84.0	84.0	84.0	90.0	90.0	90.0	110.0	110.0	110.0
RH, %	53.0	53.0	53.0	37.0	37.0	37.0	10.0	10.0	10.0
Conditioning	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0	0	0	0	0
Pressure Losses									
Inlet Loss, inH2O	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH2O	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	100	75	50	100	75	50	100	75	50
kW, Gen Terms	91737	68825	45903	89891	67441	44981	86273	64729	43173
Est. Btu/kW-hr, LHV	7998	8374	9271	8030	8418	9324	8163	8570	9503
Guar. Btu/kW-hr, LHV	8331	8723	9657	8365	8768	9712	8503	8927	9899
Fuel Flow									
MMBtu/hr, LHV	733.7	576.3	425.5	721.9	567.7	419.4	704.2	554.7	410.3
lb/hr	35566	27937	20629	34992	27519	20330	34138	26889	19889
NOx Control									
	Water	Water	Water	Water	Water	Water	Water	Water	Water
Water Injection									
lb/hr	27543	18335	11204	27273	18517	11451	28984	19977	12582
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intercooler									
	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air
Humidification	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s	26366	20657	13817	25956	20733	14059	27176	21888	15157
KOD Water Extraction, lb/s	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Parameters									
HP Speed, RPM	9357	9148	8971	9355	9144	8964	9344	9128	8942
LP Speed, RPM	5272	4969	4747	5273	4984	4760	5299	5034	4805
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	514.9	430.2	334.6	506.7	423.6	329.8	493.7	413.4	322.8
T23 - Intcrl Inlet Temp, °F	358.2	338.2	300.8	364.9	344.8	307.6	386.2	366.1	329.5
P23 - Intcrl Inlet Pressure, psia	50.4	46.3	39.3	49.6	45.6	38.8	48.2	44.4	38.0
W23 - Intcrl Inlet Flow, lb/s	408.3	352.7	309.6	401.2	347.1	304.4	390.6	338.6	296.3
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	720	684	657	720	685	657	722	686	657
T48IN, °R	2031	1942	1878	2031	1943	1877	2031	1942	1874
T48IN, °F	1572	1483	1418	1572	1483	1417	1571	1482	1414
Exhaust Parameters									
Temperature, °F	801.9	780.8	797.4	804.6	783.4	799.1	813.0	791.2	804.5
lb/sec	423.0	363.5	289.2	416.3	358.0	285.2	406.0	349.7	279.6
lb/hr	1522954	1308436	1041046	1498790	1288642	1026631	1461495	1258984	1006699
Energy, Btu/s- ref 0 °R	138769	116414	93483	136802	114790	92199	133904	112501	90479
Cp, Btu/lb-R	0.2776	0.2749	0.2739	0.2775	0.2747	0.2736	0.2769	0.2739	0.2727

Estimated Average Engine Performance NOT FOR GUARANTEE



GE Energy

Performance By: Johnny Metcalf
Project Info:

Engine: LMS100 PA
Deck Info: G0179C - 87o.scp
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb,LHV

Date: 08/09/2005
Time: 2:44:28 PM
Version: 3.3.6

Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)

NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	74	58	43	73	57	42	71	56	41
CO ppmvd Ref 15% O2	114	105	84	115	109	89	130	127	109
CO, lb/hr	204.70	148.49	87.73	203.14	151.72	91.57	223.57	173.07	109.10
CO2, lb/hr	95584.27	75157.44	55568.98	94040.90	74024.34	54755.95	91704.84	72289.57	53539.39
HC ppmvd Ref 15% O2	5	4	2	5	4	3	6	6	4
HC, lb/hr	4.75	3.20	1.43	4.75	3.39	1.62	5.72	4.38	2.43
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Maxlmin Emissions

NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
CO ppmvd Ref 15% O2	132	132	132	128	128	128	120	120	120
VOC ppmvd Ref 15% O2	3.00	3.00	3.00	3.00	3.00	3.00	3.60	3.60	3.00
PM10 lbs/hr	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00

Predicted (P) / Guaranteed Emissions - Stack

NOx ppmvd Ref 15% O2	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5
NOx as NO2, lb/hr	7.4	5.8	4.3	7.3	5.7	4.2	7.1	5.6	4.1
NH3 Slip ppmvd Ref 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO ppmvd Ref 15% O2	3.7/6.0	3.7/6.0	3.7/6.0	3.4/6.0	3.4/6.0	3.4/6.0	3.0/6.0	3.0/6.0	3.0/6.0
CO, lb/hr	6.6/10.7	5.2/8.4	4.0/6.4	6.1/10.8	4.8/8.4	3.6/6.4	5.2/10.4	4.1/8.2	3.3/6.5
VOC ppmvd Ref 15% O2	1.8 (P)	1.8 (P)	1.7 (P)	1.8 (P)	1.8 (P)	1.7 (P)	2.1 (P)	2.2 (P)	1.7 (P)
VOC, lb/hr	1.9	1.5	1.0	1.8	1.5	1.0	2.1	1.7	1.0

PM10 lbs/hr Based on the stated level of SOx (i.e. 0), there should be no particulate contribution from the catalysts.

Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	1.2193	1.2258	1.2315	1.2201	1.2275	1.2336	1.2253	1.2330	1.2394
N2	71.5097	71.8680	72.2192	71.5544	71.9876	72.3426	71.8627	72.3093	72.6817
O2	12.9960	13.8753	14.5619	13.0121	13.9048	14.6051	13.1035	14.0039	14.7278
CO2	6.2762	5.7441	5.3378	6.2745	5.7444	5.3336	6.2747	5.7419	5.3183
H2O	7.9816	7.2522	6.6383	7.9217	7.1206	6.4733	7.5147	6.6947	6.0189
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0134	0.0113	0.0084	0.0136	0.0118	0.0089	0.0153	0.0137	0.0108
HC	0.0003	0.0002	0.0001	0.0003	0.0003	0.0002	0.0004	0.0003	0.0002
NOX	0.0033	0.0030	0.0028	0.0033	0.0030	0.0028	0.0033	0.0030	0.0028

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9744	0.9706	0.9677	0.9743	0.9705	0.9676	0.9742	0.9704	0.9674
N2	81.4881	81.1686	80.9264	81.4849	81.1645	80.9192	81.4704	81.1494	80.8976
O2	12.9656	13.7160	14.2859	12.9730	13.7254	14.3026	13.0058	13.7592	14.3517
CO2	4.5526	4.1284	3.8074	4.5483	4.1227	3.7976	4.5282	4.1019	3.7681
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0153	0.0128	0.0094	0.0154	0.0133	0.0100	0.0173	0.0154	0.0121
HC	0.0006	0.0005	0.0003	0.0006	0.0005	0.0003	0.0008	0.0007	0.0005
NOX	0.0034	0.0030	0.0028	0.0034	0.0030	0.0028	0.0033	0.0030	0.0028

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8536	0.8610	0.8674	0.8545	0.8628	0.8697	0.8602	0.8688	0.8761
N2	71.3908	72.0005	72.5359	71.4604	72.1562	72.7300	71.9398	72.6604	73.2651
O2	11.3590	12.1668	12.8048	11.3770	12.2021	12.8551	11.4844	12.3199	12.9976
CO2	3.9885	3.6621	3.4127	3.9888	3.6652	3.4133	3.9985	3.6728	3.4126
H2O	12.3911	11.2951	10.3680	12.3024	11.0987	10.1202	11.6982	10.4610	9.4348
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0134	0.0114	0.0085	0.0135	0.0118	0.0090	0.0153	0.0138	0.0109

Estimated Average Engine Performance NOT FOR GUARANTEE



GE Energy

Performance By: Johnny Metcalf
Project Info:

Engine: LMS100 PA
Deck Info: G0179C - 870.scp
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb,LHV

Date: 08/09/2005
Time: 1:38:16 PM
Version: 3.3.6

Case #	100	101	102	103	104	105	106	107	108
Ambient Conditions									
Dry Bulb, °F	84.0	84.0	84.0	90.0	90.0	90.0	110.0	110.0	110.0
Wet Bulb, °F	70.9	70.9	70.9	70.0	70.0	70.0	68.4	68.4	68.4
RH, %	53.0	53.0	53.0	37.0	37.0	37.0	10.0	10.0	10.0
Altitude, ft	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0	360.0
Ambient Pressure, psia	14.506	14.506	14.506	14.506	14.506	14.506	14.506	14.506	14.506
Engine Inlet									
Comp Inlet Temp, °F	84.0	84.0	84.0	90.0	90.0	90.0	110.0	110.0	110.0
RH, %	53.0	53.0	53.0	37.0	37.0	37.0	10.0	10.0	10.0
Conditioning	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE	NONE
Tons or kBtu/hr	0	0	0	0	0	0	0	0	0
Pressure Losses									
Inlet Loss, inH2O	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50	4.50
Exhaust Loss, inH2O	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Partload %	100	75	50	100	75	50	100	75	50
kW, Gen Terms	95938	71975	48002	94689	71039	47377	90214	67683	45142
Est. Btu/kW-hr, LHV	7988	8360	9248	8019	8402	9298	8152	8555	9480
Guar. Btu/kW-hr, LHV	8321	8708	9634	8353	8752	9686	8492	8911	9875
Fuel Flow									
MMBtu/hr, LHV	766.3	601.7	443.9	759.3	596.9	440.5	735.4	579.0	427.9
lb/hr	37149	29168	21520	36808	28933	21355	35650	28068	20744
NOx Control									
	Water	Water	Water	Water	Water	Water	Water	Water	Water
Water Injection									
lb/hr	29329	19593	12016	29317	19999	12432	30724	21204	13371
Temperature, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Intercooler									
	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air	Water-Air
Humidification	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
IC Heat Extraction, btu/s	27512	21558	14441	27288	21785	14798	28364	22836	15837
KOD Water Extraction, lb/s	0.6	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Control Parameters									
HP Speed, RPM	9358	9148	8970	9356	9145	8963	9346	9130	8942
LP Speed, RPM	5277	4971	4748	5279	4986	4761	5303	5035	4807
PT Speed, RPM	3600	3600	3600	3600	3600	3600	3600	3600	3600
PS3 - CDP, psia	537.4	448.8	349.1	532.4	445.0	346.5	515.0	431.2	336.7
T23 - Intcr Inlet Temp, °F	358.5	338.4	301.2	365.2	345.0	308.0	386.4	366.3	329.9
P23 - Intcr Inlet Pressure, psia	52.6	48.3	41.0	52.1	47.8	40.7	50.3	46.3	39.7
W23 - Intcr Inlet Flow, lb/s	426.0	367.9	322.8	421.5	364.5	319.5	407.4	353.1	308.8
T25 - HPC Inlet Temp, °F	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
T3CRF - CDT, °F	721	685	657	721	685	657	722	687	658
T48IN, °R	2031	1942	1876	2031	1942	1875	2031	1942	1872
T48IN, °F	1572	1483	1416	1572	1483	1415	1571	1482	1412
Exhaust Parameters									
Temperature, °F	800.9	779.6	795.3	803.3	782.0	796.7	812.0	790.1	802.6
lb/sec	441.5	379.3	301.9	437.5	376.1	299.8	423.6	364.8	291.8
lb/hr	1589505	1365340	1086690	1575091	1353965	1079109	1524911	1313327	1050554
Energy, Btu/s- ref 0 °R	144691	121333	97390	143611	120449	96696	139614	117255	94262
Cp, Btu/lb-R	0.2775	0.2748	0.2738	0.2775	0.2746	0.2735	0.2769	0.2739	0.2726

Estimated Average Engine Performance NOT FOR GUARANTEE



GE Energy

Performance By: Johnny Metcalf
Project Info:

Engine: LMS100 PA
Deck Info: G0179C - 870.scp
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb,LHV

Date: 08/09/2005
Time: 1:38:16 PM
Version: 3.3.6

Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)

NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
NOx as NO2, lb/hr	77	60	45	76	60	44	74	58	43
CO ppmvd Ref 15% O2	117	109	88	118	114	94	133	131	112
CO, lb/hr	219.46	160.50	95.60	220.09	166.21	101.51	238.70	185.60	117.72
CO2, lb/hr	99829.87	78459.73	57964.02	98908.83	77816.77	57509.67	95757.44	75449.41	55834.02
HC ppmvd Ref 15% O2	5	4	3	5	5	3	6	6	5
HC, lb/hr	5.21	3.58	1.66	5.27	3.85	1.94	6.20	4.78	2.70
SOX as SO2, lb/hr	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Maximim Emissions

NOx ppmvd Ref 15% O2	25	25	25	25	25	25	25	25	25
CO ppmvd Ref 15% O2	132	132	132	128	128	128	120	120	120
VOC ppmvd Ref 15% O2	3.0	3.0	3.0	3.0	3.0	3.0	3.6	3.6	3.0
PM10 lbs/hr	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0

Predicted (P) / Guaranteed Emissions - Stack

NOx ppmvd Ref 15% O2	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5	2.5 / 2.5
NOx as NO2, lb/hr	7.7	6.0	4.5	7.6	6.0	4.4	7.4	5.8	4.3
NH3 Slip ppmvd Ref 15% O2	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
CO ppmvd Ref 15% O2	4.0/6.0	4.0/6.0	4.0/6.0	3.8/6.0	3.8/6.0	3.8/6.0	3.3/6.0	3.3/6.0	3.3/6.0
CO, lb/hr	7.5/11.3	5.9/8.8	4.5/6.7	7.1/11.2	5.7/9.0	4.2/6.8	5.9/10.7	4.6/8.4	3.5/6.4
VOC ppmvd Ref 15% O2	1.8 (P)	1.9 (P)	1.8 (P)	1.8 (P)	1.8 (P)	1.7 (P)	2.2 (P)	2.2 (P)	1.7 (P)
VOC, lb/hr	2.0	1.6	1.1	2.0	1.5	1.1	2.2	1.8	1.0

Based on the stated level of SOx (i.e. 0), there should be no particulate contribution from the catalysts.

CO	0.0138	0.0118	0.0088	0.0140	0.0123	0.0094	0.0157	0.0141	0.0112
HC	0.0003	0.0003	0.0002	0.0003	0.0003	0.0002	0.0004	0.0004	0.0003
NOX	0.0033	0.0030	0.0028	0.0033	0.0030	0.0028	0.0033	0.0030	0.0028

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9744	0.9706	0.9677	0.9744	0.9706	0.9676	0.9742	0.9704	0.9673
N2	81.4903	81.1695	80.9237	81.4877	81.1659	80.9165	81.4737	81.1515	80.8958
O2	12.9602	13.7136	14.2921	12.9662	13.7216	14.3084	12.9978	13.7541	14.3557
CO2	4.5554	4.1295	3.8036	4.5518	4.1245	3.7938	4.5324	4.1044	3.7654
H2O	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0157	0.0133	0.0099	0.0159	0.0138	0.0105	0.0178	0.0159	0.0125
HC	0.0007	0.0005	0.0003	0.0007	0.0006	0.0004	0.0008	0.0007	0.0005
NOX	0.0034	0.0030	0.0028	0.0034	0.0030	0.0028	0.0033	0.0030	0.0028

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8538	0.8612	0.8677	0.8546	0.8630	0.8699	0.8600	0.8687	0.8761
N2	71.4030	72.0220	72.5651	71.4693	72.1682	72.7499	71.9253	72.6513	73.2650
O2	11.3559	12.1681	12.8159	11.3721	12.2005	12.8643	11.4745	12.3134	13.0016
CO2	3.9915	3.6641	3.4108	3.9922	3.6672	3.4109	4.0012	3.6745	3.4102
H2O	12.3785	11.2697	10.3290	12.2943	11.0856	10.0926	11.7195	10.4744	9.4328
SO2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
CO	0.0138	0.0118	0.0088	0.0140	0.0123	0.0095	0.0157	0.0142	0.0113
HC	0.0006	0.0005	0.0003	0.0006	0.0005	0.0003	0.0007	0.0006	0.0005
NOX	0.0029	0.0027	0.0025	0.0029	0.0027	0.0025	0.0030	0.0027	0.0025

Aero Energy Fuel Number

	son Mission)		900-1056 (Edison Mission)		900-1056 (Edison Mission)	
	Volume %	Weight %	Volume %	Weight %	Volume %	Weight %
Hydrogen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Methane	96.1130	91.5453	96.1130	91.5453	96.1130	91.5453

Estimated Average Engine Performance NOT FOR GUARANTEE



GE Energy

Performance By: Johnny Metcalf

Project Info:

Engine: LMS100 PA
Deck Info: G0179C - 87o.scf
Generator: BDAX 98-330ER 60Hz, 13.8kV, 0.9PF (35410)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb,LHV

Date: 08/09/2005
Time: 1:38:16 PM
Version: 3.3.6

Ethane	1.8030	3.2188	1.8030	3.2188	1.8030	3.2188
Ethylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Propane	0.3030	0.7933	0.3030	0.7933	0.3030	0.7933
Propylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Butane	0.1030	0.3554	0.1030	0.3554	0.1030	0.3554
Butylene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Butadiene	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Pentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Cyclopentane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hexane	0.0330	0.1688	0.0330	0.1688	0.0330	0.1688
Heptane	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Carbon Dioxide	1.2430	3.2480	1.2430	3.2480	1.2430	3.2480
Nitrogen	0.4030	0.6703	0.4030	0.6703	0.4030	0.6703
Water Vapor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Oxygen	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Ammonia	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Btu/lb, LHV	20629		20629		20629	
Btu/scf, LHV	918		918		918	
Btu/scf, HHV	1018		1018		1018	
Btu/lb, HHV	22871		22871		22871	
Fuel Temp, °F	77.0		77.0		77.0	
NOx Scalar	0.983		0.983		0.983	
Specific Gravity	0.58		0.58		0.58	
Engine Exhaust						
Exhaust MW	28.0	28.1	28.1	28.0	28.1	28.2
Exhaust Flow, ACFM	857103	721425	579841	850712	716286	575886
Exhaust Flow, SCFM	344867	295262	234334	341627	292590	232485
Exhaust Flow, Btu/lb	328	320	323	328	320	323
Exhaust Flow, Calories/s	36462061	30575822	24542341	36190074	30353028	24367372
Inlet Flow Wet, pps	426.2	368.1	322.9	421.7	364.7	319.6
Inlet Flow Dry, pps	420.5	363.1	318.6	416.9	360.6	316.0
Shaft HP	130763	98437	66149	129077	97175	65309
Generator Information						
Capacity kW	126633	126633	126633	122927	122927	122927
Efficiency	0.984	0.981	0.973	0.984	0.980	0.973
Inlet Temp, °F	84.0	84.0	84.0	90.0	90.0	90.0
Gear Box Loss	N/A	N/A	N/A	N/A	N/A	N/A
8th Stage Bleed						
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000
Temperature, °R	0	0	0	0	0	0
CDP Bleed						
Flow, pps	0.0	0.0	0.0	0.0	0.0	0.0
Pressure, psia	0.000	0.000	0.000	0.000	0.000	0.000
CardPack	87o	87o	87o	87o	87o	87o
Intercooler Cardpack	87m	87m	87m	87m	87m	87m



TURBINE GEN SET PERFORMANCE
FOR
Edison Mission Energy

GUARANTEED PARAMETERS		JOBSITE LOCATION: TBD, California	
Emissions per Unit with GE Supplied SCR and CO Catalyst			
Btu/kW·hr, LHV	AT	UNIT NET KW	100% to 50% Load
8281		97258	NOx EMISSIONS
(kJ/kW·hr, LHV)			2.5 PPMVD AT 15 % O2
8736			CO EMISSIONS
			6 PPMVD AT 15 % O2
			PM10 *
			6 lbs/hr (front and back half)
			VOC EMISSIONS *
			2.0 PPMVD AT 15 % O2
			NH3 SLIP
			5 PPMVD AT 15 % O2
NOT VALID WITHOUT STAMP			

BASIS OF GUARANTEE:	BASE LOAD, GAS FUEL NOZZLE SYSTEM NO BLEED OR EXTRACTED POWER
ENGINE:	(1) GE LMS100PA GAS TURBINE
FUEL:	20629 Btu/lb / (47983 kJ/kg) LHV, GAS FUEL (#900-1056)
FUEL TEMP:	50°F (28°C) above dew point, @ GE ENERGY BASEPLATE Maximum Fuel Temperature 250°F (121.1°C)
GENERATOR OUTPUT:	13.8 kV, 60 Hz
POWER FACTOR:	≥ .9
AMBIENT TEMP:	84.0°F / (28.9°C)
AMBIENT RH:	53.4%
INLET CONDITIONING:	EVAP TO 73.0°F / (22.8°C)
ALTITUDE:	360.0 ft / (109.7 m)
INLET FILTER LOSS:	≤ 4.50 inH ₂ O / (114.3 mmH ₂ O)
EXHAUST LOSS:	≤ 12.70 inH ₂ O / (322.6 mmH ₂ O)
NOX CONTROL:	WATER
INJECTION RATE:	30128 PPH / (13666 KG/hr) ±20% FLOW
INJECTION TEMP:	100 °F / (37.8 °C) @ GE ENERGY BASEPLATE
ENGINE CONDITION:	NEW AND CLEAN ≤ 200 SITE FIRED HOURS
FIELD TEST METHODS	
PERFORMANCE:	GE ENERGY SGTGPTM
NOX:	SCAQMD Test Method 100.1
CO:	SCAQMD Test Method 100.1
VOC:	TO 12
PM10:	SCAQMD Test Method 5.1
NH3:	SCAQMD Test Method 207.1

** SI values are for reference purposes only

THIS GUARANTEE SUPERSEDES ANY
PREVIOUS GUARANTEES PRESENTED



***Conditions for PM10 Emissions Guarantee**

1. Fuel must meet GE specification MID-TD-000-01.
2. The timing of test to coincide with lowest site ambient particulate levels.
3. Gas turbine must run for a minimum of 300 total fired hours at base load prior to testing.
4. Gas turbine inlet and exhaust system must be free of any dirt,sand,mud,rust,oil or any other contaminants.
5. Sampling probe internal surfaces must be made of chemically inert and non-catalytic material such as quartz.
6. The filter material shall be quartz.
7. Probe wash shall be high purity acetone per EPA Method 5.
8. Re-testing (at purchaser's expense) must be allowed, if required.
9. GE receives a copy of the final test results.
10. A compressor wash prior to testing is highly recommended.
11. The area around the turbine is to be treated (e.g.sprayed down with water) to minimize airborne dust.

***Conditions for VOC Emissions Guarantee**

1. Fuel must meet GE specification MID-TD-000-01.
2. The timing of test to coincide with lowest site ambient VOCs levels.
3. Gas turbine must run for a minimum of 300 total fired hours at base load prior to testing.
4. Gas turbine inlet and exhaust system must be free of any dirt,sand,mud,rust,oil or any other contaminants.
5. Re-testing (at purchaser's expense) must be allowed, if required.
6. GE receives a copy of the final test results.
7. A compressor wash prior to testing is highly recommended.



Estimated Average Engine Performance NOT FOR GUARANTEE

GE Energy

Performance By: Jennifer Woods
Project Info: So Cal Edison

Engine: LMS100 PA
Deck Info: G0179C - 87a.scp
Generator: GH155A 60Hz, 13.8kV, 0.9PF (16283)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

Date: 05/25/2005
Time: 8:52:37 AM
Version: 3.3.1

Case #	100	
Ambient Conditions		
Dry Bulb, °F	84.0	
Wet Bulb, °F	71.0	
RH, %	53.4	
Altitude, ft	360.0	
Ambient Pressure, psia	14.506	
Engine Inlet		
Comp Inlet Temp, °F	73.0	
RH, %	91.1	
Conditioning	EVAP	
Tons or kBtu/hr	0	
Pressure Losses		
Inlet Loss, inH ₂ O	4.50	
Exhaust Loss, inH ₂ O	12.70	
		Net Package Power and Heat Rate
kW, Gen Terms	98431	97258 kW
Est. Btu/kW-hr, LHV	7937	8032 Btu/kW-hr
Guar. Btu/kW-hr, LHV	8267	8281 Btu/kW-hr
GTG Auxiliary, kW	1173	
Fuel Flow		
MMBtu/hr, LHV	781.2	
lb/hr	37869	
NOx Control	Water	
Water Injection		
lb/hr	30128	
Temperature, °F	100.0	
Intercooler	Water-Air	
Humidification	OFF	
IC Heat Extraction, btu/s	28141	
KOD Water Extraction, lb/s	1.8	
Control Parameters		
HP Speed, RPM	9358	
LP Speed, RPM	5277	
PT Speed, RPM	3600	
P53 - CDP, psia	547.5	
T23 - Inlet Inlet Temp, °F	346.3	
P23 - Inlet Inlet Pressure, psia	53.5	
W23 - Inlet Inlet Flow, lb/s	435.2	
T25 - HPC Inlet Temp, °F	100.0	
T3CRF - CDT, °F	722	
T4BIN, °R	2031	
T4BIN, °F	1572	
Exhaust Parameters		
Temperature, °F	796.2	
lb/sec	449.9	
lb/hr	1619667	
Energy, Btu/s - ref 0 °R	146848	
Cp, Btu/lb-R	0.2773	
Emissions (NOT FOR USE IN ENVIRONMENTAL PERMITS)		
NOx ppmvd Ref 15% O ₂	25	
NOx as NO ₂ , lb/hr	79	
CO ppmvd Ref 15% O ₂	118	
CO, lb/hr	226.08	
CO ₂ , lb/hr	101760.80	
HC ppmvd Ref 15% O ₂	5	
HC, lb/hr	5.41	
SOX as SO ₂ , lb/hr	0.00	



GE Energy

Performance By: Jennifer Woods
Project Info: So Cal Edison

Engine: LMS100 PA
Deck Info: G0179C - 870.scp
Generator: GH155A 60Hz, 13.8kV, 0.9PF (10283)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

Date: 05/25/2005
Time: 8:52:37 AM
Version: 3.3.1

Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	1.2195
N2	71.5193
O2	12.9887
CO2	6.2828
H2O	7.9720
SO2	0.0000
CO	0.0140
HC	0.0003
NOX	0.0033

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9744
N2	81.4916
O2	12.9571
CO2	4.5570
H2O	0.0000
SO2	0.0000
CO	0.0159
HC	0.0007
NOX	0.0034

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8538
N2	71.4053
O2	11.3534
CO2	3.9930
H2O	12.3770
SO2	0.0000
CO	0.0139
HC	0.0006
NOX	0.0029

Aero Energy Fuel Number 900-1056 (Edison Mission)

	Volume %	Weight %
Hydrogen	0.0000	0.0000
Methane	96.1130	91.5453
Ethane	1.8030	3.2188
Ethylene	0.0000	0.0000
Propane	0.3030	0.7933
Propylene	0.0000	0.0000
Butane	0.1030	0.3554
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Pentane	0.0000	0.0000
Cyclopentane	0.0000	0.0000
Hexane	0.0330	0.1688
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.2430	3.2480
Nitrogen	0.4030	0.6703
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000
Btu/lb, LHV	20629	
Btu/scf, LHV	918	
Btu/scf, HHV	1018	
Btu/lb, HHV	22871	
Fuel Temp, °F	77.0	
NOx Scalar	0.983	
Specific Gravity	0.58	



Performance By: Jennifer Woods
Project Info: So Cal Edison

Engine: LMS100 PA
Deck Info: G0179C - 870.scp
Generator: GH155A 60Hz, 13.8kV, 0.9PF (16283)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

Date: 05/25/2005
Time: 8:52:45 AM
Version: 3.3.1

Case # 100
Ambient Conditions
Dry Bulb, °C 28.9
Wet Bulb, °C 21.7
RH, % 53.4
Altitude, m 109.7
Ambient Pressure, kPa 100.015

Engine Inlet
Comp Inlet Temp, °C 22.8
RH, % 91.1
Conditioning EVAP
Tons or kBTU/hr 0

Pressure Losses
Inlet Loss, mmH2O 114.30
Exhaust Loss, mmH2O 322.58

kW, Gen Terms 98431
Est. kJ/kWh, LHV 8374
Guar. kJ/kWh, LHV 8722
GTG Auxiliary, kW 1173
Fuel Flow
GJ/hr, LHV 824.2
kg/hr 17177

Net Power and Heat Rate

97258 kW
8474 kJ/kWh
8736 kJ/kWh

NOx Control Water

Water Injection
kg/hr 13666
Temperature, °C 37.8

Intercooler Water-Air
Humidification OFF
IC Heat Extraction, kJ/s 29690
KOD Water Extraction, kg/s 0.8

Control Parameters
HP Speed, RPM 9358
LP Speed, RPM 5277
PT Speed, RPM 3600
PS3 - CDP, kPa 3775.0
T23 - Intert Inlet Temp, °C 174.6
P23 - Intert Inlet Pressure, kPa 369.0
W23 - Intert Inlet Flow, kg/s 197.4
T25 - HPC Inlet Temp, °C 37.8
T3CRF - CDT, °C 383
T4SIN, °R 1129
T4SIN, °C 855

Exhaust Parameters
Temperature, °C 424.5
kg/sec 204.1
kg/hr 734676
Energy, J/s - ref 0 °K 154933616
KJ/kg-R 1.1608

Emissions [NOT FOR USE IN ENVIRONMENTAL PERMITS]

NOx mg/Nm3 Ref 15% O2 51
NOx as NO2, kg/hr 36
CO mg/Nm3 Ref 15% O2 148
CO, kg/hr 102.55
CO2, kg/hr 46158.42
HC mg/Nm3 Ref 15% O2 4
HC, kg/hr 2.45
SOX as SO2, kg/hr 0.00



Estimated Average Engine Performance NOT FOR GUARANTEE

GE Energy

Performance By: Jennifer Woods
Project Info: So Cal Edison

Engine: LMS100 PA
Deck Info: G0179C - 870.scp
Generator: GH155A 60Hz, 13.8kV, 0.9PF (16283)
Fuel: Site Gas Fuel#900-1056, 20629 Btu/lb, LHV

Date: 05/25/2005
Time: 8:52:45 AM
Version: 3.3.1

Exh Wght % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	1.2195
N2	71.5193
O2	12.9887
CO2	6.2928
H2O	7.9720
SO2	0.0000
CO	0.0140
HC	0.0003
NOX	0.0033

Exh Mole % Dry (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.9744
N2	81.4916
O2	12.9571
CO2	4.5570
H2O	0.0000
SO2	0.0000
CO	0.0159
HC	0.0007
NOX	0.0034

Exh Mole % Wet (NOT FOR USE IN ENVIRONMENTAL PERMITS)

AR	0.8538
N2	71.4053
O2	11.3534
CO2	3.9930
H2O	12.3770
SO2	0.0000
CO	0.0139
HC	0.0006
NOX	0.0029

Aero Energy Fuel Number 900-1056 (Edison Mission)

	Volume %	Weight %
Hydrogen	0.0000	0.0000
Methane	96.1130	91.5453
Ethane	1.8030	3.2188
Ethylene	0.0000	0.0000
Propane	0.3030	0.7933
Propylene	0.0000	0.0000
Butane	0.1030	0.3554
Butylene	0.0000	0.0000
Butadiene	0.0000	0.0000
Perlane	0.0000	0.0000
Cyclopentane	0.0000	0.0000
Hexane	0.0330	0.1688
Heptane	0.0000	0.0000
Carbon Monoxide	0.0000	0.0000
Carbon Dioxide	1.2430	3.2480
Nitrogen	0.4030	0.6703
Water Vapor	0.0000	0.0000
Oxygen	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000
Ammonia	0.0000	0.0000
kJ/kg, LHV	47983	
kJ/Nm3, LHV	36051	
kJ/Nm3, HHV	39975	
kJ/kg, HHV	53198	
Fuel Temp, °C	25.0	
NOx Scalar	0.983	
Specific Gravity	0.58	

Edison Mission Energy
Recycled Water Supply and Cooling Water
Air Emissions Modelling Composition Basis

Constituent	Walnut Site San Jose Creek WRP Average Daily Design Basis <u>Concentration as Such</u> (mg/l)	Walnut Site Recirculating Cooling Water Composition At 8.1 Cycles of Concentration <u>Concentration as Such</u> (mg/l)
<u>General Parameters</u>		
Alkalinity as CaCO ₃	147	1187.3925
Hardness as CaCO ₃	192	1550.88
Nitrate as NO ₃	19	153.4725
pH (Units)	6.9	7.6
Total Dissolved Solids	619	5000
Total Solids	677	5050
Turbidity	<2 NTU	<100 NTU
<u>Chemical Parameters</u>		
Arsenic	<0.0009	<0.00727
Boron	0.47	3.796425
Cadmium	<0.0003	<0.00242
Calcium	48.6	392.5665
Chloride	147	1187.3925
Chromium, T	<0.01	<0.081
Copper	<0.006	<0.0485
Fluoride	0.33	2.665575
Iron	0.093	0.7512075
Lead	<0.001	<0.0081
Magnesium	17	137.3175
Manganese	0.027	0.2180925
Mercury	<0.00003	<0.00024
Nickel	<0.018	<0.145
Potassium	14.6	117.9315
Silica	No Data	No Data
Silver	<0.0002	<0.0016
Sodium	134	1082.385
Sulfate	127	1025.8425
Zinc	0.08	0.6462

Generator and Fire Pump Engine Emissions

		Emission Factors					Full Load Emissions				
		NOx (g/kW-hr)	SO ₂ ^c (g/kW-hr)	CO (g/kW-hr)	PM (g/kW-hr)	HC (g/kW-hr)	NOx (lb/hr)	SO ₂ (lb/hr)	CO (lb/hr)	PM (lb/hr)	HC (lb/hr)
Generator ^{a,b}	(kW) 1,750	8.3	0.0074	1.2	0.13	0.4	32.02	0.03	4.63	0.50	1.54
Generator	hp 2,347	NOx (g/hp-hr) 6.19	SO ₂ ^c (g/hp-hr) 0.0055	CO (g/hp-hr) 0.89	PM (g/hp-hr) 0.10	HC (g/hp-hr) 0.30	NOx (lb/hr) 32.02	SO ₂ (lb/hr) 0.03	CO (lb/hr) 4.63	PM (lb/hr) 0.50	HC (lb/hr) 1.54
Fire Pump ^{d,e} Engine	hp 300	NOx (g/hp-hr) 5.2	SO ₂ ^c (g/hp-hr) 0.0055	CO (g/hp-hr) 0.27	PM (g/hp-hr) 0.09	HC (g/hp-hr) 0.15	NOx (lb/hr) 3.44	SO ₂ (lb/hr) 0.004	CO (lb/hr) 0.18	PM (lb/hr) 0.06	HC (lb/hr) 0.10

^a Generator emission factors from CARB certified emissions data for 2005 (engine family number 5CPXL78.1ERK) Executive Order U-R-001-0267

^b Generator engine: Catpillar model 3516B TA, 1750 kW at 1800 RPM (2,347 hp)

^c SO₂ emission factor from Chapter 3, Table 3.4-1 of EPA AP-42, Compilation of Air Pollutant Emission Factors with 15 ppm sulfur (0.0015% S) content in oil

^d Fire pump engine: Clarke model JW6H-UJF40, 300 hp at 2,350 RPM.

^e Emission factors based on vendor information

Standard Diesel Fuel Analysis Data

Parameter	1	2	3	4	5	6	7	8	9	10	Avg.
C %	86.73	87.96	87.84	84.77	86.78	86.8	83.93	84.07	84.64	85.05	85.86
H %	13.01	11.28	11.41	12.72	12.91	12.96	15.55	15.63	15.16	12.9	13.35
O %	.2	.59	.58	2.46	.2	.2	.2	.2	.2	1.68	0.65
N %	.01	.14	.14	.01	.04	.03	.25	.19	.15	.01	0.097
S %	.05	.02	.02	.05	.06	.055	.05	.055	.06	.05	0.047
Ash %	.01	.01	.01	.01	.01	.01	.01	.01	.01	.01	0.01
Btu/lb	19600	20485	20572	19600	19600	19600	19100	19250	19500	19500	19680

Data derived from AB2588 fuel tests for sources in the South Coast AQMD.